

UNITED STATES PATENT APPLICATION

FOR

METHOD AND SYSTEM FOR CATEGORIZING ITEMS IN BOTH
ACTUAL AND VIRTUAL CATEGORIES

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METHOD AND SYSTEM FOR CATEGORIZING ITEMS IN BOTH ACTUAL AND VIRTUAL CATEGORIES

[0001] The present application claims priority from U.S. provisional patent application number 60/199,731 entitled "Method and System for Categorizing Items in Both Actual and Virtual Categories" filed April 24, 2000.

FIELD OF THE INVENTION

[0002] The present invention relates generally to the field of database architecture and, more specifically, to the categorizing of database items in both an actual category and a virtual category.

BACKGROUND OF THE INVENTION

[0003] Web sites, or other network-based data aggregators or presenters, commonly use category schemas to provide context and structure for data items. For example, within an on-line web site directory, such as that presented by Yahoo! Incorporated of Santa Clara, California, web sites are commonly classified under an extensive category schema.

Within commercial web sites, product or service offerings are also commonly classified under a category schema so as to enable convenient user navigation of offerings to locate offerings of interest. For example, eBay, Incorporated of San Jose, California, implements an extensive

categorization schema for an on-line auction service. Specifically, a seller wishing to post an item for auction on the on-line auction facility is required to specify a category for the relevant product offering.

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SUMMARY OF THE INVENTION

[0004] According to a first aspect of the present invention, there is provided a method of constructing a category structure within a database including defining a first structure of categories to classify a data item, the first structure including at least a first category. A second structure of categories is also defined to provide an alternative classification for the data item, the second structure including at least a second category. The second category is associated with the first category.

[0005] According to a second aspect of the present invention, there is provided a method of facilitating location of a data item within a database. User navigation of a first category structure, to select a first category, is facilitated. A second category of a second category structure is identified as being linked to the first category of the first category structure. Data items of the second category are identified responsive to the selection of the first category of the first category structure.

[0006] Other features of the present invention will be apparent from the accompanying drawing and from the detailed description that follows.

BRIEF DESCRIPTION OF THE DRAWINGS

[0007] The present invention is illustrated by way of example and not limitation in the figures of the accompanying drawings, in which like references indicate similar elements and in which:

[0008] **Figure 1** is a block diagram illustrating an exemplary network-based transaction facility in the form of an internet-based auction facility 10.

[0009] **Figure 2** is a database diagram illustrating an exemplary database, maintained and accessed via a database engine server, which at least partially implements and supports the auction facility.

[0010] **Figure 3** is a representation of an item table, according to an exemplary embodiment of the present invention, that may include a category identifier corresponding to an identifier of one or more real categories defined within a category table of the database.

[0011] **Figure 4** is a diagrammatic representation of an exemplary category table, and of an exemplary category class, that may be instantiated as objects that reference a category table.

[0012] **Figure 5** is a diagrammatic representation of an exemplary populated category table, which is populated with exemplary records from both an

actual category as well as two virtual categories.

[0013] **Figure 6** is a conceptual diagram illustrating a view of selected actual categories and virtual categories within an exemplary database, as defined within one or more exemplary category tables.

[0014] **Figure 7** is a flow chart illustrating a method, according to an exemplary embodiment of the present invention, of constructing a category structure within a database.

[0015] **Figure 8** is a flow chart detailing a method, according to an exemplary embodiment of the present invention, of facilitating the location of a data item by navigation of a hierarchy of virtual categories.

[0016] **Figure 9A** provides an example of a markup language document that lists a number of top-level virtual categories.

[0017] **Figure 9B** illustrates an example of a markup language document that may present an exemplary list of mixed-level categories.

[0018] **Figure 9C** is an example of a markup language document that may be utilized to present both next level, or leaf, categories and data items identified to a user.

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[illegible]

Database Structure

[0029] Figure 2 is a database diagram illustrating an exemplary database 23, maintain by and accessed via the database engine server 22, which at least partially implements and supports the auction facility 10. The database 23 may, in one embodiment, be implemented as a relational database, and includes a number of tables having entries, or records, that are linked by indices and keys. In an alternative embodiment, the database 23 may be implemented as collection of objects in an object-oriented database.

[0030] Central to the database 23 is a user table 40, which contains a record for each user of the auction facility 10. A user may operate as a seller, buyer, or both, within the auction facility 10. The database 23 also includes item tables 42 that may be linked to the user table 40. Specifically, the tables 42 include a seller items table 44 and a bidder items table 46. A user record in the user table 40 may be linked to multiple items that are being, or have been, auctioned via the facility 10. A link indicates whether the user is a seller or a bidder (or buyer) with respect to items for which records exist within the item tables 42.

[0031] The database 23 also includes one or more category tables 47. Each record within the category table 47 describes a respective category. In one embodiment, a specific category table 47 may describe multiple, hierarchical category structures, and include multiple category records, each of which may describe the context of a particular category within the one of the multiple hierarchical category structures. For example, the category table 47

may describe a number of real, or actual, categories to which item records, within the item tables 42, may be linked. For example, as shown in **Figure 3**, an item table 42 may include a category identifier 62 corresponding to an identifier of one or more real categories defined within the category table 47.

[0032] The category table 47 may also define a number of "virtual" hierarchical category structures that support alternative navigation paths that may be presented to a user to locate a particular item. In one embodiment, categories of a "virtual" hierarchical category structure are not directly referenced within item records within the item tables 42, but are instead linked to "real" categories. Accordingly, in one embodiment, no category identifiers 62 within the item tables 42 point directly to a "virtual" category. As will be described in further detail below, multiple virtual categories may be linked to a single real category.

[0033] The database 23 also includes a note table 48 populated with note records that may be linked to one or more item records within the item tables 42 and/or to one or more user records within the user table 40. Each note record within the table 48 may include, *inter alia*, a comment, description, history or other information pertaining to an item being auction via the auction facility 10, or to a user of the auction facility 10.

[0034] A number of other tables are also shown to be linked to the user table 40, namely a user past aliases table 50, a feedback table 52, a feedback details table 53, a bids table 54, an accounts table 56, an account balances table 58 and a transaction record table 60.

[illegible]

[10040] Turning first to the hierarchy of actual categories 90, a parent (passenger vehicle) category includes a "Ford" child category, the "Ford" category being indicated as a child of the "passenger car" category by inclusion of the category identifier (e.g., 50) within the level1 field 78 of the record for the "Ford" category. The "Ford" category in turn is shown to include a "Taurus" sub-category and a "Model T" sub-category. It will be noted the "Taurus" and the "Model T" categories are indicated in the IS-LEAF field 76 as being leaf categories of the hierarchy of actual categories 90. It will furthermore be noted that, for each category within the hierarchy of actual categories 90, the actual_category field 86 contains a null value, as these categories are not linked to, and do not point to, further categories.

[0042] The "Taurus" category of the virtual categories 92 is also shown, within the actual_category field 86, to include the identifier of the "Taurus" category of the actual categories 90. In this way, the virtual "Taurus"

category, identified by the category identifier "8001" is linked to, or points to, the actual "Taurus" category identified by the category identifier "8000". In this way, user navigation of the hierarchy of virtual categories 92, when resulting in the selection of the virtual "Taurus" category, can be utilized to identify the category identifier for an actual "Taurus" category, that can in turn be utilized to identify records within an item table 42.

[0043] Similarly, the hierarchy of virtual categories 94 is headed by a "vintage cars" category that includes a child "Ford" category and a grandchild "Model T" category. The "Model T" category is again linked, by an appropriate category identifier within the actual_category field 86, to the actual "Model T" category of the actual categories 90.

[0044] It will furthermore be noted that, in one embodiment, only real categories are indicated in the IS_LEAF field 76 as being leaf categories.

[0045] In one embodiment of the present invention, as mentioned above, data items may only be categorized under a hierarchy of actual categories 90, and not under a hierarchy of virtual categories. It is for this reason that only actual categories may be indicated as leaf categories.

[0046] While the hierarchies of virtual categories 92 and 94 are indicated as being distinct hierarchies, these hierarchies may in fact be sub-hierarchies of a larger hierarchy of virtual categories. Nonetheless, the present application contemplates that the category table 47 may define multiple hierarchies of virtual categories, and that multiple virtual categories may be linked to, or pointed to, a single actual category.

example, by performing a "point-and-click" operation utilizing a cursor control device, a user may select the "cars" category of the virtual categories 140 shown in **Figure 9A**, the selection being communicated to a CGI server 18 that in turn communicates the selection to an appropriate CGI script.

[0055] At block 126, a list of next-level virtual category is presented, based on the virtual category selected at block 124. **Figure 9B** illustrates an example of a markup language document that may be utilized to present an exemplary list 144 of such mixed-level categories. For example, a CGI script executing within a CGI server 18 and responsive to identification of a user-selected top-level category, may, via the database engine server 22, query the category table 47 to identify virtual categories that are child categories of the "cars" category. The results of this query are then communicated to a page server 12 that populates a template to generate the markup language document illustrated in **Figure 9B**. The list 144 of virtual categories shown in **Figure 9B** accordingly represents child categories of the "cars" virtual category.

[0056] At block 128, a user selection of a next-level virtual category is detected, in the same manner described above. For example, assuming user selection of a hypertext link 146 for the "Ford" category of the list 144 of categories shown in **Figure 9B**, this user selection may be communicated to a CGI server 18.

[0057] At block 130, a leaf category, or leaf categories, of the virtual category selected at block 128 may, in one embodiment, be identified so as to facilitate

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[0066] **Figures 10B-10E** illustrates a further user interface 170 via which a user (i.e., a seller) may specify actual category information. In an exemplary embodiment, the information inputted by the user at block 172, as shown in **Figure 10B**, specifies an actual category. Specifically, for passenger vehicles, a leaf category is defined by a passenger vehicle make and model.

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